

# Environmental Management Learning: Improving Public Environmental Awareness in River Bengawan Solo Riverbank

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**Abstract—** In the historical development, river is a form of oldest civilization in the world. So that, river has very important role in human life. But, human awareness to keep and maintain river becomes lower when time goes by. Rivers are often converted to be used as waste disposal site by humans. It results urgency that efforts to keep and care about rivers are necessarily needed to be done, especially in developing country like Indonesia. In this paper, authors give an idea to arouse public awareness through the Environmental Management Learning Program with a case study in Bengawan Solo riverbank. It is because River Bengawan Solo is one of the rivers which has become one of the highest carbon emitters in Indonesia due to various human activities towards this river. Therefore, this program can be developed in the riverbank of many countries, especially developing countries.

**Keywords—** developing countries; education; environment; riverbank; society

## I. INTRODUCTION

River is one of the important elements in human life because it has very big role for the sustainability of a country. But, a research shows that rivers in the world are in state of crisis. An international scientists team estimates almost 80% of the world population or about 5 billion people live in areas with level of threat to water security which is quite high (Vörösmarty, et al., 2010).

The main cause of this evidence is the error of river and pollution management. So, an urgent effort to do is to make all parties keep and care about river especially in developing countries, including Indonesia. Based on the results of monitoring conducted by the Ministry of Environment towards river water quality index, it shows a tendency of pollution to increase by 30%. The highest pollution of river water is indicated from the increase of domestic waste. Pollutant which gets into the river is generally caused by human behaviour.

Whereas, negative impacts caused by pollution of the river water are very much and harm creatures. So, it is necessary to take various actions to combat the pollution of river water in Indonesia. Moreover, watershed management is one aspect of the water resources management in water resources development areas which is a utilization effort of water

resources in an integrated manner with efforts to control and preserve the river itself (Suganda, et al., 2009).

Bengawan Solo is the longest river in Java Island, Indonesia. This river has two upstream in Pegunungan Kidul, Wonogiri, and Ponorogo. While, River Bengawan Solo downstream is in Gresik. Nowadays, current condition of the watershed and River Bengawan Solo is very alarming. Complex issues, ranging from government policy, watershed management, and public environmental awareness to the careless action of industrial parties in waste disposal, add the problems of this river. One of very alarming cases is the establishment of pig farms in Village Gunungsari, Ngringo, Jaten, Karanganyar.

Based on the explanation of Solopos daily on March 12, 2012, a pig farm located just 50 meters from River Bengawan Solo usually dumps waste from farm pig feces directly into River Bengawan Solo. In fact, not only being disposal site of feces, River Bengawan Solo has also been used as a waste dump industries ranging from small to large scale industries. Those various activities make River Bengawan Solo become one of the 9 rivers of carbon emitters in Indonesia. Even, Kompas newspaper reported that the Head of Climate Change and Air Quality of Meteorology, Climatology, and Geophysics Institution, Edvin Aldrian, at an international workshop Climate Information Services in Supporting Mitigation and Adaptation to Climate Change in Infrastructure and Health Sectors in Jakarta said that River Bengawan Solo has the highest volume of dissolved organic carbon reaching 342,000 tons per year.

The purpose of this paper is to find solutions towards the problems of river pollution with a learning-based program for society about the importance of environmental awareness, starting from the description of program, implementation steps, and implications. So, this paper will reveal the importance of Environmental Management Learning as an effort to increase public awareness towards the environment along the river, particularly River Bengawan Solo.

## II. METHODS

Techniques used in this study are a case study of River Bengawan Solo damage. Moreover, study design used is

descriptive method which is supported by primary and secondary data. Primary data were obtained from participatory observation and interviews to key informants, while secondary data were obtained from document review and analysis.

Participatory observations were conducted in the community development service program which run from March to September 2013 in Village Gondangsari, Klaten, Jawa Tengah, Indonesia. In addition, interviews were conducted with some informants such as the administrators of Bengawan Solo School of Nature and the initiator of Eco city learning, Ir. Kusumastuti. Observations were done in Village Gondangsari and Bengawan Solo School of Nature. While, the review and analysis of documents were obtained from various printed and electronic media which are relevant to the subject matter studied.

### III. RESULTS AND DISCUSSION

#### A. Public Awareness towards River

Public awareness to preserve river is currently very low. Additionally, Bengawan Solo watershed is now not functioning properly because it has been missused and left as unproductive or damaged land. Based on observations at various points along Bengawan Solo riverbank, watershed is only used as a garbage dump. Watershed management is inseparable from a variety of problems, such as the degradation of natural resources, pollution from various sources, as well as land use conflicts in the watershed (Clark, 1996).

Interviews and observations to the citizens of Village Gondangsari at the socialization of land utilization along Bengawan Solo riverbank give the following results: Public awareness to preserve River Bengawan Solo is still low, so that the land of Bengawan Solo riverbank, especially in Village Gondangsari is still less productive. Although society has known that the land can be used to support economic facilities, they do not know the proper way of utilization. The issue is a common problem experienced by society near the riverbank in developing countries such as Indonesia.



Fig. 1. The Condition of Bengawan Solo Watershed

A research has proven that public's education level is one aspect that determines the extent to which the public has environmental awareness on a wider scale than the neighbourhood (Syme, Nancarrow, and Jorgensen, 2002). Thus, education program is needed to increase public awareness of environmental concerns, especially concerns related to river which became the beginning of human civilization development.

#### B. Environmental Management Learning Program

Environmental Management Learning is an environmental education program for society, especially riverbank society. Based on the interview with Ir. Kusumastuti, a program which the object is society should be done through three approaches of social capital which are norm, trust, and social cooperation. Norm can be embedded with the implementation of environmental education to children and teenagers to make them understand the importance of protecting the environment as early as possible. In addition, environmental education can also be disseminated to the society by a sustainable system. These activities will foster a belief of the program. The emergence of trust will underpin the happening of social cooperation.

This program can be directed to establish a social, environmental, and economic based activities. The purpose of these three pillars is to be socially accepted by society, accountable ecologically, and able to provide economic benefits for all parties involved (Ma'mun and Ezmira, 2012).

According to Diduck (2013), an assessment is needed to be done in an activity that involves society and environment. The assesment is in the concept of Critical Environmental Assessment (CEA). CEA education offers tools for resource and environmental managers to be used in managing public engagement process. This model challenges current patterns of resource use and addresses criticisms of public engagement process. CEA education involves cognitive development and personal empowerment focusing on critical intelligence, problem solving, and social action.

Society-based watershed management is a management approach that involves cooperation between local society and government in the form of joint management in which society actively participates in planning to implementation steps (Suganda, et al., 2009). So, society as the human resources must be trained and briefed in order to play an active role in this program. Some form of activities that can be done are such as leadership training and sustainable environmental management socialization to embed norms on every individual.

Prioritizing human in project development to customize plan with implementation has been a necessity. Humans are no longer identified as a target group, but they should be viewed as the expected beneficiaries (Uphoff, 1988). When trust began to build in the society, social cooperation phase can be implemented. Social cooperation that can be implemented includes the utilization of environment as an eco-tourism area. The society can utilize watershed as an environmental-based education tourism area to open up business opportunities for the society. The benefits of this program are for example, society can gain sustainable environmental education with activities that involve them to learn both directly and indirectly.

Thus, the implication of this program covers: cognitive development and personal empowerment in local society; the simplification of complex discourse frequently encountered in the management of resources; reduction in feelings of powerlessness that often experienced by members of the society in environmental assessment; reduction of ignorance

and uncertainty regarding issues of environmental management resources; conflict resolution at cognitive level; and clarification opposing values, interests, or actions towards conflict (Diduck, 2013).

#### IV. CONCLUSION

Based on the results and discussion of this paper, it can be concluded that environmental management education program is necessarily needed for riverbank society. Environmental Management Learning Program can be developed through three interrelated aspects which are social, environment, and economy. These three aspects are as references to develop the program starting from embedding norms through education to establish public trust. Once the trust is formed, the next step is utilizing social cooperation to utilize watershed area for mutual benefit and financial benefit which still considers environmental sustainability. Thus, there must be integration in design, utilization, and control process of the watershed management. This program must be implemented continuously because changing public paradigm that has long been rooted in the society requires long process. So, it needs cooperation between central government, local government, relevant institutions, and society to implement this program well.

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